

Work Order ID 54716

December 16, 2009 3:29:17 PM



Page 1

Item ID: D3898-1

Accept



Setup

Start



Revision ID:

Item Name: Floor Protector (206L)

Stop



Start Date: 16/12/2009 Start Qty: 4.00



Cust Item ID:

Required Date: 18/12/2009 Req'd Qty: 4.00



Customer:

Reference:

Approvals: Process Plan:

Date: 09/12/09

Tooling:

Date:

Run

Start



QC:

Date: _____

SPC (Y/N):

Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description
--------------------------------	--------------------------

Set Up/ Run Hours

Draw Number

Draw Rev.

Plan Code

Accept Qty

Reject Qty

Reject Number

Insp. Stamp

Draw Nbr	Revision Nbr
----------	--------------

D3898	Rev A
-------	-------

100

0.00



HandThermo

Memo

0.00

Hand Finishing Thermoforming

Memo

110

0.00



Thermoform

Memo

0.00

Thermoforming Machine

1-Machine Set-Up

2-Pre-heat Tool to required temp.

3-Thermoform as per Dwg and Folio #FTA0xx using tool DT9501

Dwg Rev: A

Folio Rev: B

10/01/09 (X4)

10/01/19 (X4)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 54716



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Page 2

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Customer:

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Approvals: Process Plan:

Date:

Tooling:

Date:

Run



Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

120

QC2- Inspect parts off machine FAI/FAIB

0.00

SL 10/01/19 X4



QC

Memo

0.00

Quality Control

Visually inspect part for proper formation and texture

130

QC8- Inspect parts - second check

0.00

BB

10/01/19
X4



QC

Memo

0.00

Quality Control

140

0.00



HandThermo

Memo

0.00

Hand Finishing Thermoforming

I-Trim to finished dimensions as per Dwg

SL 10/01/19 X4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 54716

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Item ID: D3898-1

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Setup

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Revision ID:

Item Name: Floor Protector (206L)

Start Date: 16/12/2009 Start Qty: 4.00



Cust Item ID:

Required Date: 18/12/2009 Req'd Qty: 4.00



Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

150



QC

Quality Control

QC2- Inspect parts off machine FAI/FAIB

0.00

OK 10/01/19 X3

Memo

0.00

Complete FAI document

160



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

5/10/03/64

X3 X0

Memo

0.00

170



Packaging

Packaging

Identify as per dwg & Stock Location: _____

0.00

PPD
53986

Memo

0.00

6/10/03/5 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D3898-1 PAR #: Fault Category: Thermoforming NCR: Yes No DQA: Date: 10/03/16
 Resolution: ⁽¹⁾ scrap / ⁽²⁾ Accepted Disposition: ⁽¹⁾ scrap / ⁽²⁾ use as is. QA: N/C Closed: Date: 10/03/16

NCR: 54716		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
(1) 10/01/19	150	Scrap 1 part (too thin) Rel. scrap machine manufacture	GP 10.03.04 per QSI 042	Modify mould to enlarge radii on inside tunnel ^{see PAR 09-037} no replace	Wb 10/03/04 QSI 042	S 10/03/04	GP 10.03.04 per QSI 042	S 10/03/04
(2) 10.03.04	150	MIN THICKNESS = 0.068" in area marked 0.080"	GP 10.03.04 per QSI 042	Acceptable based on DS Email.	Wb 10/03/04 QSI 042	S 10/03/04	GP 10.03.04 per QSI 042	S 10/03/04

NOTE: Date & initial all entries

Work Order ID 54716

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Page 4

Item ID: D3898-1

Accept



Setup Start



Revision ID:

Item Name: Floor Protector (206L)

Stop



Start Date: 16/12/2009 Start Qty: 4.00



Cust Item ID:

Required Date: 18/12/2009 Req'd Qty: 4.00



Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

180

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/03/11 HJ

MF
10-3-05

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

December 16, 2009 3:29:21 PM

Page 1

Work Order ID: 54716



Parent Item: D3898-1



Parent Item Name: Floor Protector (206L)

Start Date: 16/12/2009

Required Date: 18/12/2009

Comments:

Start Qty: 4.00

Required Qty: 4.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Reute Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

MLEXS.118-90318-08

Purchased

No

100

sf

2,818.330 42.4000



Lexan Sheet

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
------------------	----------------	-----------------

Location

Main Warehouse

MAT

111588
113127

2818.33

98.33
2720

4x10.634 =

42.5 sq. ft.

St. 10/01/11

W/O:		WORK ORDER CHANGES							
DATE	STEP	PROCEDURE CHANGE			By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	54716
Description: Floor Protector	Part Number:	D3898-1
Inspection Dwg: D3898	Rev: A	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

x First Article Prototype

THERMOFORMING SECTION

Description	Accept	Reject	Method of Inspection	Comments
Inside Radii less than "	✓			
Shape Definition	✓			
Texture Retention	✓			
Material imperfections such as bumps, cracks, voids, scratching	✓			

Measured by

Date:

10/11/10

TRIMMING SECTION

Measured by:

Date: 10/01/19

Audited by:

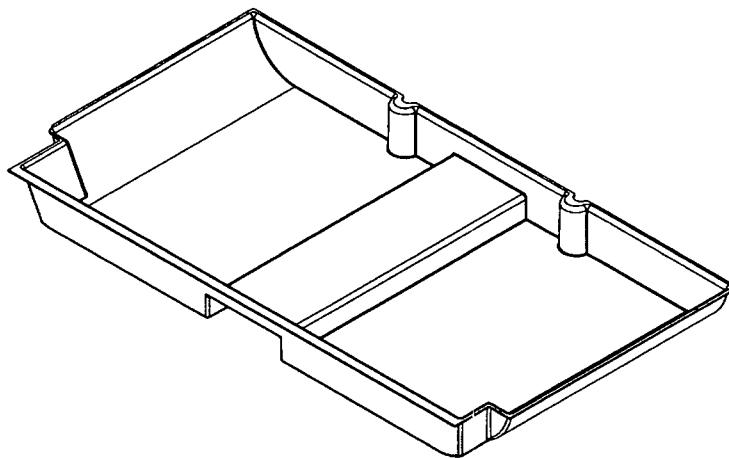
Date: 10/01/19

Prototype Approval:

N/A

Date: N/A

Rev	Date	Change	Revised by	Approved
A	09.09.15	New Issue	KJ	MM



D3898-1 FLOOR PROTECTOR (206L)

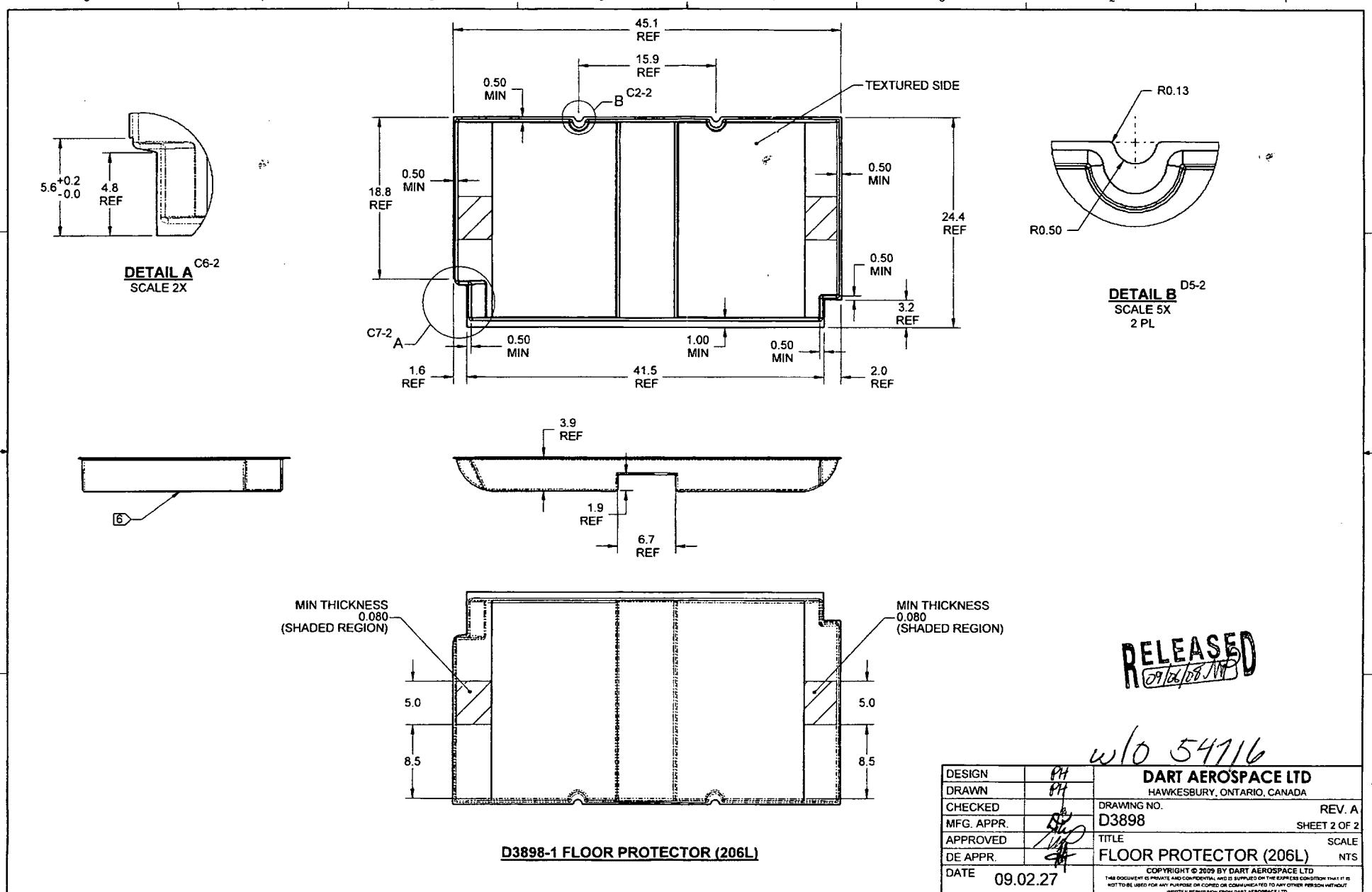
NOTES:

- 1) MATERIAL: LEXAN 90318 (PROTECT-A-GLAZE), 0.118 THICK, 112-CLEAR (MLEXS.118-90318-08)
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: IDENTIFY WITH DART P/N "D3898-1" USING VIBRATING STYLUS
- 7) WEIGHT: 5.0 lbs
- 8) TOOLING: THERMOFORM PER MOLD DT9501 PER DART QSI 022. TRIM PER MOLD
- 9) MINIMUM THICKNESS: 0.050" EXCEPT AS SHOWN

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 54174
BT 09-12-16

RELEASED
09/06/08 MJS

A	NEW ISSUE	PH	09.02.27
REV.	DESCRIPTION	BY	DATE
DESIGN	<u>PH</u>	DART AEROSPACE LTD	
DRAWN	<u>PH</u>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<u>PH</u>	DRAWING NO.	REV. A
MFG. APPR.	<u>PH</u>	D3898	SHEET 1 OF 2
APPROVED	<u>PH</u>	TITLE	SCALE
DE APPR.	<u>PH</u>	FLOOR PROTECTOR (206L)	NTS
DATE	09.02.27	COPYRIGHT © 2009 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY OTHER PURPOSE THAN THAT FOR WHICH IT WAS PROVIDED, OR FOR ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



DESIGN	PH
DRAWN	PH
CHECKED	
MFG. APPR.	
APPROVED	
DE APPR.	
DATE	09.02.27

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. D3898 REV. A
SHEET 2 OF 2

TITLE FLOOR PROTECTOR (206L) SCALE NTS

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RELEASED
09/02/09 MP

w/o 54716

Chris Provencal

From: David Shepherd [dshepherd@dartaero.com]
Sent: February 11, 2010 12:39 PM
To: 'Daryl Leger'
Cc: 'Mike Petsche'; cprovencal@dartaero.com; 'Bill Beckett'
Subject: RE: 206-407 Clear polycarbonate floor protectors.

Daryl,

I find this really frustrating. I don't totally buy what your selling. Seems to me we've been having these sorts of problems since we started thermoforming on almost every part we make. I thought we'd been drying our polycarbonate for a couple of years already ... didn't think we just started doing this. The 206/407 floor protectors were tested this summer, so the material should have been dried out before we made the test articles. Why would we follow a different process for prototype parts than production parts, especially when we know that thickness is critical to my acceptance of the part???

I think a lot of the problems stem from the environmental variation. In the summer, its often 40 degrees with high humidity while in the winter, building temperature at the back door is probably down around 15 degrees and the humidity is a lot lower. The floor protectors were tested in the summer and you're doing a production run in the winter. I also know you've rotated the machine since the summer, so this might be a factor.

If drying out the material gives the most consistent results, then I suggest we overdry the test articles so that we get the minimum thickness possible when we test. Also suggest we try to pull all test parts on cool, non-humid days.

Anyways ... enough ranting and raving. To me, the allowable thickness on the forward floor protectors is irrelevant to the rear floor protectors. The loads are based on weight and size of the part, so the loads are considerably higher on the rear floor protectors. What is relevant is the loads that were required and how much load we actually applied during the test.

Per TR-D407-781-5, we were required to pull 20 lb UP, 80 lb FWD, 40 lb SIDE, and 7.5 lb REAR and we actually applied 35 lb UP, 140 lb FWD, 66 lb SIDE, and 30 lb REAR. Bearing/shear stress near the fasteners will be 1:1 dependant on thickness (as opposed to the middle of the part which is in bending). Therefore we have a minimum margin of 65% based on the side loading.

You are requesting a 20% reduction in thickness. Therefore, the parts are acceptable to me

If you are seeing decreased thicknesses in other parts that puts them below the minimums on the drawings, I hope you are properly reporting this through the right channels and having the deviations approved by Engineering. Personally, I haven't seen anything. If the thicknesses are low on the aft facing seat pans, I can almost guarantee you that we will be re-testing since we don't have the same margins. This is expensive ... and I believe we have already re-tested once before for you for thickness problems.

Chris,

Please update the minimum thickness near the attachment points to be 0.065" (fuck it ... give him 0.060" to be safe) per Daryl's request on D3875-1, D3898-1 (there is no -2), and D3940-1. The design review should include a rationale similar to the one I have presented above, except that you can eliminate the ranting and raving.

David

From: Daryl Leger [mailto:dleger@dartaero.com]

Sent: Tuesday, February 02, 2010 2:25 PM
To: David Shepherd
Cc: Mike Petsche; cprovencal@dartaero.com
Subject: 206-407 Clear polycarbonate floor protectors.

David

As per our conversation last Friday,
I would like to request that a minimum thickness requirement be changed on the drawings for the rear floor protectors, models 206 and 407.

The reason is that now we are drying our polycarbonate prior to thermoforming.
This drying, evaporates any moisture content in the sheet and eliminates air that can get trapped in the sheet while thermoforming. Trapped air in the sheet can cause unsightly blistering in the sheet and also causes the sheet to expand in thickness because of the air trapped in the sheet. (Remember the expanding polycarbonate rear-facing seats)

We can now thermoform a more uniform part and in our opinion, a much better product because of the uniform material distribution and the clarity of the finished product.

The only drawback is that we have difficulty in meeting thickness requirements in some areas. The original test parts were made prior to us understanding the necessity of sheet drying and the material thickness in those test parts, was not near as uniform..

The pilot and co-pilot (D3874-1/2) floor protectors call for a minimum thickness of 0.050 at the area of the attachment points, which is not an issue.

The rear floor protectors (D3875-1, D3898-2 and D3940-1) however call for a minimum thickness of 0.080 at the area of the attachment points. A minimum thickness of 0.050" is called for over the main body for the rest of the rear floor protectors. This is where we are running into a problem.

The recent floor protectors we vacuum formed, have a pretty constant thickness of 0.068" - 0.070" throughout the whole part including the attachment area.

Is it possible to revise the drawings to decrease the thickness requirement of the rear floor protectors at the attachment area to 0.065" without having to re-test.

Based on the argument that the forward protectors only have a thickness requirement of 0.050" at the attachment point, I hope this would be acceptable

PS. This problem is not unique to this product, we are also seeing decreased thicknesses in the aft-facing seats, R44 floor protectors and expect to see it in all the other polycarbonate products we haven't made in a while

RSVP

Daryl L. Leger
Production Engineering Co-ordinator

DART

aerospace

TEL: 613-632-5200

FAX: 613-632-1426

EMAIL: dleger@dartaero.com

No virus found in this incoming message.

Checked by AVG - www.avg.com

Version: 8.5.435 / Virus Database: 271.1.1/2663 - Release Date: 02/02/10 07:35:00